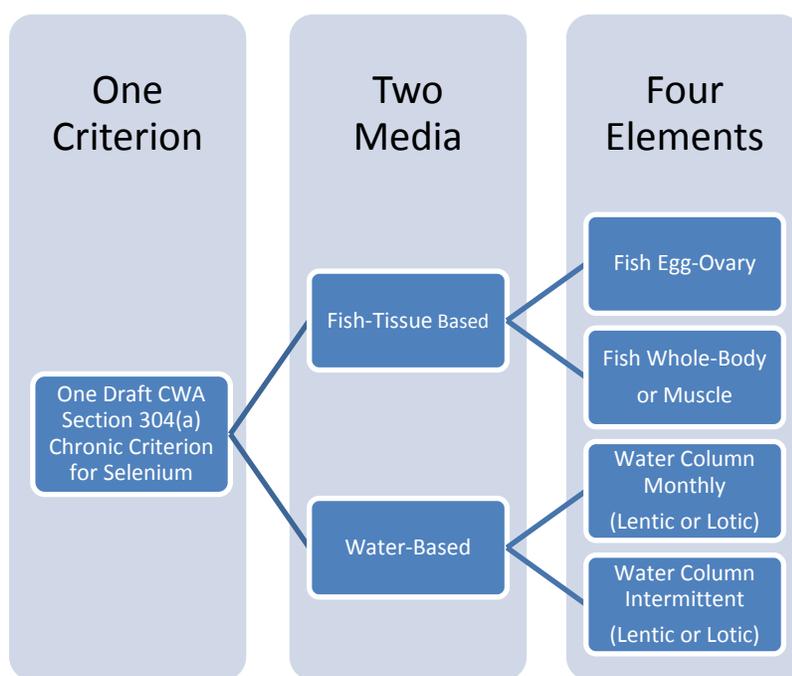


# Draft Aquatic Life Ambient Water Quality Criterion for Selenium (Freshwater) 2015

## Summary

EPA is updating its national recommended chronic aquatic life criterion for selenium in freshwater to reflect the latest scientific information, which indicates that toxicity to aquatic life is driven by dietary exposures. EPA published an “External Peer Review” version of the draft criterion document in May 2014, accepted comments from the public, and submitted the draft to a contractor-led external expert peer review panel to ensure that the Agency was using the best available science. EPA incorporated changes reflecting comments from the peer review panel, as well as the public, and is accepting written comments from the public on a draft criterion document for 60 days. EPA will then revise the document and issue a final selenium criterion. As shown in Figure 1, the draft criterion has four elements, consisting of two fish tissue-based and two water column-based elements. The draft criterion document contains a recommendation that states and authorized tribes adopt into their water quality standards a selenium criterion that includes all four elements. EPA recommends that fish tissue elements be given precedence over the water column elements when both types of data are available, because fish tissue-based concentration is a more direct measure of selenium toxicity to aquatic life than water column concentrations. The draft selenium criterion is protective of the whole aquatic community, including fish, invertebrates, and amphibians.

**Figure 1**



## **Background**

EPA published the current national recommended chronic selenium water quality criterion for the protection of aquatic life (5 ug/L) in 1987. EPA sponsored an expert workshop on selenium in 1998 that recommended the fish-tissue criterion approach as more reliable than a water criterion. In 1999, EPA published the current recommended acute water column selenium criterion and reaffirmed the 1987 chronic criterion. In 2004, EPA published in the Federal Register a draft criterion expressed as a whole-body fish tissue concentration. Based on findings from the 2009 International Expert Workshop on selenium and collaboration with the U.S. Geological Survey (USGS) on a bioaccumulation model, EPA then revised the 2004 draft to include criteria based on egg-ovary tissue concentration and water column concentrations.

EPA developed the 2014 External Peer Review draft of the chronic freshwater selenium water quality criterion using the best available science. As shown in Table 1, the draft criterion has four elements, all originating from the egg-ovary criterion element in a hierarchical fashion. The translation of fish tissue to water was accomplished using a peer-reviewed model developed by the USGS. The External Peer Review draft was sequentially reviewed first by the public during the comment process, and then by an external expert peer review panel. EPA addressed comments made during these processes and developed the 2015 draft selenium criterion document.

## **Who is affected by this draft criterion document?**

Ambient water quality criteria for the protection of aquatic life are numeric concentrations of pollutants, with recommended duration and frequency, in surface waters that are protective of aquatic life designated uses. Under Clean Water Act section 304(a), EPA is required to develop and publish and, from time to time, revise, criteria for protection of water quality and human health that accurately reflect the latest scientific knowledge. EPA develops water quality criteria based solely on data and scientific information about the relationship between pollutant concentrations and environmental and human health effects. EPA's recommended water quality criteria are not rules, nor do they automatically become part of a state's water quality standards. States and authorized tribes must adopt into their standards water quality criteria that protect the designated uses of the water bodies within their area. The selenium criterion is recommended for adoption across the nation, but it may be particularly relevant for states that have more naturally-occurring selenium and for certain industry sectors.

## **Where can I find more information?**

EPA has established an official public docket for this action, Docket ID No. EPA-HQ-OW-2004-0019, which can be accessed via the Federal government regulations website at [www.regulations.gov](http://www.regulations.gov). You may also download the criterion document and supporting information from EPA's aquatic life website at <http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/selenium/index.cfm>. For other information on the criterion, contact Kathryn Gallagher by telephone at (202) 564-1398, by email at [gallagher.kathryn@epa.gov](mailto:gallagher.kathryn@epa.gov), or by mail at U.S. EPA, MC: 4304T, 1200 Pennsylvania Ave., N.W., Washington, D.C. 20460.

**Table 1. 2015 Draft Selenium Chronic Criterion (Freshwater)**

Criterion Element	Magnitude	Duration	Frequency
Fish Tissue (Egg-Ovary) <sup>1</sup>	15.8 mg/kg dw	Instantaneous measurement <sup>5</sup>	Never to be exceeded
Fish Tissue (Whole Body) <sup>2</sup>	8.0 mg/kg dw	Instantaneous measurement <sup>5</sup>	Never to be exceeded
Fish Tissue (Muscle) <sup>2</sup>	11.3 mg/kg dw	Instantaneous measurement <sup>5</sup>	Never to be exceeded
Water (Lentic) <sup>3</sup>	1.2 ug/L	30-day average	Not to be exceeded more than once in three years on average
Water (Lotic) <sup>3</sup>	3.1 ug/L	30-day average	Not to be exceeded more than once in three years on average
Water (Intermittent) <sup>4</sup>	$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$	Intermittent Exposure <sup>6</sup> Number of days fewer than 30 with an elevated concentration	Not to be exceeded more than once in three years on average

<sup>1</sup> Overrides whole-body, muscle, or water column elements when egg/ovary concentrations are measured except in certain situations (See footnote 3).

<sup>2</sup> Overrides any water column element when both fish tissue and water concentrations are measured, except in certain situations (See footnote 3).

<sup>3</sup> Water column values are based on dissolved total selenium in water. Water column values have primacy over fish tissue values under two circumstances: 1) "Fishless waters" (waters where fish have been extirpated, or where physical habitat and/or flow regime cannot sustain fish populations); and 2) New (see glossary) or increased inputs of selenium from a specific source until equilibrium is reached.

<sup>4</sup> Where  $WQC_{30-day}$  is the water column monthly element, for either a lentic or lotic system, as appropriate.  $C_{bkgrnd}$  is the average background selenium concentration, and  $f_{int}$  is the fraction of any 30-day period during which elevated selenium concentrations occur, with  $f_{int}$  assigned a value  $\geq 0.033$  (corresponding to 1 day).

<sup>5</sup> Instantaneous measurement. Fish tissue data provide point measurements that reflect integrative accumulation of selenium over time and space in the fish at a given site. Selenium concentrations in fish tissue are expected to change only gradually over time in response to environmental fluctuations.

<sup>6</sup> Where  $WQC_{30-day}$  is the water column monthly element, for either a lentic or lotic system, as appropriate.  $C_{bkgrnd}$  is the average background selenium concentration, and  $f_{int}$  is the fraction of any 30-day period during which elevated selenium concentrations occur, with  $f_{int}$  assigned a value  $\geq 0.033$  (corresponding to 1 day).